

**TITLE: Organics in Space: Results from Space Exposure Platforms and Nanosatellites**

B.H. Foing, ESA ESTEC, Noordwijk, NETHERLANDS; P. Ehrenfreund, GWU, Washington, District of Columbia, UNITED STATES; F. Salama, NASA Ames, Mountain View, California, UNITED STATES

A series of successful “laboratory astrophysics” experiments performed on International Space Station (ISS) external platforms such as EXPOSE have provided insights into the evolution of organic and biological materials in space and planetary environments. The study of the reactions, destruction, and longevity of organics in the space environment is of fundamental interest. To provide an accurate outer space environment for extended durations, exposure experiments in low Earth orbit have been conducted in the last decades in order to examine the consequences of actual space conditions including combinations of solar and cosmic radiation, space vacuum, and microgravity. The O/OREOS (Organism/ORganic Exposure to Orbital Stresses) nanosatellite studied in situ during the 6-month primary and 1-year extended mission the photochemical processing of selected PAHs in low Earth orbit (650 km altitude); results were autonomously telemetered to Earth. We report on the methods and flight preparation of samples for space exposure platforms and results on the stability of organic thin-films. The UV-vis degradation process of thin-films was recorded over time, which revealed intriguing and counter-intuitive photolytic kinetics that will be re-investigated on the ISS in a space environment.